DOCUMENT RESUME

ED 254 830 CS 007 952

AUTHOR Johnson, Dale D.; And Others
TITLE An Investigation of the Effects of Prior Knowledge and Vocabulary Acquisition on Passage Comprehension. Program Report 84-5.
INSTITUTION Wisconsin Center for Education Research, Madison.
SPONS AGENCY National Inst. of Education (ED), Washington, DC.
PUB DATE Nov 84
GRANT NIE-G-81-0009
NOTE 46p.; A report from the Program on Classroom Processes: Skill Development--Language Arts. Funding was also provided by Ginn and Company.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Comparative Analysis; Grade 4; Intermediate Grades; Language Acquisition; *Prior Learning; *Reading Comprehension; *Reading Instruction; *Reading Research; *Reading Strategies; Teaching Methods; *Vocabulary Development
IDENTIFIERS Semantic Feature Analysis; Semantic Mapping

ABSTRACT

A study was conducted to identify the contributions of both prior knowledge and prereading vocabulary instruction to passage comprehension. In addition, semantic mapping and semantic feature analysis--instructional strategies that build upon students' prior knowledge--were compared with a modified basal approach for effectiveness as prereading instructional treatments for both vocabulary acquisition and passage comprehension. Fourth grade students from 13 classrooms were placed in either a full, partial, or control treatment group. Students in the full treatment group received prereading vocabulary instruction and read a basal passage prior to taking vocabulary and comprehension tests; subjects in the partial group either received vocabulary instruction or read the passage prior to testing; and subjects in the control group neither received vocabulary instruction nor read the passage before testing. Results showed that all three treatments were effective in teaching target vocabulary words. Significant gains were observed between the vocabulary pretest and posttest for the students receiving full and partial instruction. Findings also confirmed a strong relationship between prior knowledge and reading comprehension. Students with a high level of prior knowledge did well on the passage comprehension test regardless of treatment. While there were no significant treatment differences between subjects on the passage comprehension test, when they were grouped by prior knowledge level, there was a tendency for comprehension scores of students in the mapping and feature analysis groups to be higher than scores of those who received traditional instruction. (Lesson plan outlines are appended). (FL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

ED254830

Program Report 84-5

AN INVESTIGATION OF THE EFFECTS OF PRIOR KNOWLEDGE AND VOCABULARY ACQUISITION ON PASSAGE COMPREHENSION

Dale D. Johnson,

Susan D. Pittelman,

Susan Toms-Bronowski, and

Kathy M. Levin

A Report from the Program on Classroom Processes:
Skill Development--Language Arts

Wisconsin Center for Education Research
School of Education
University of Wisconsin
Madison, Wisconsin

November 1984

CS007952

Acknowledgements

The authors gratefully acknowledge the students and teachers who participated in the study. Their support of and participation in this research is greatly appreciated.

The authors also wish to acknowledge Octavio Henao Alvarez, Sandra Jones, and Gerald Calais for their efforts in the development of the instructional materials and Velma Dauer for her contributions to this report.

The authors especially want to thank Jacob Evanson for his invaluable assistance in designing the study and interpreting the data.

The research reported in this paper was funded by the Wisconsin Center for Education Research at the University of Wisconsin-Madison and Ginn and Company, Educational Publishers. The Wisconsin Center for Education Research is supported in part by a grant from the National Institute of Education (Grant No. NIE-G-81-0009). The opinions expressed in this paper do not necessarily reflect the position, policy, or endorsement of the National Institute of Education.

Wisconsin Center for Education Research

MISSION STATEMENT

The mission of the Wisconsin Center for Education Research is to understand, and to help educators deal with, diversity among students. The Center pursues its mission by conducting and synthesizing research, developing strategies and materials, and disseminating knowledge bearing upon the education of individuals and diverse groups of students in elementary and secondary schools. Specifically, the Center investigates

- diversity as a basic fact of human nature, through studies of learning and development
- diversity as a central challenge for educational techniques, through studies of classroom processes
- diversity as a key issue in relations between individuals and institutions, through studies of school processes
- diversity as a fundamental question in American social thought, through studies of social policy related to education

The Wisconsin Center for Education Research is a noninstructional department of the University of Wisconsin-Madison School of Education. The Center is supported primarily with funds from the National Institute of Education.

Table of Contents

	Page
List of Tables	vii
List of Figures	viii
Abstract	ix
Introduction	1
Vocabulary and Reading Comprehension	1
Prior Knowledge and Reading Comprehension	2
The Effects of Prior Knowledge Activation on Passage Comprehension	4
Purpose of the Present Study	6
Method	7
Subjects	7
Design	7
Procedure	7
Development of Materials	8
Selection and Validation of Passages and of Target Words	8
Development of the Prior Knowledge Test	9
Development of the Comprehension Test	9
Development of Materials for Full Instruction Condition	10
Semantic Mapping	10
Semantic Feature Analysis	10
Basal	10
Development of Materials for the Partial Treatment Condition	13
Results	15
Effectiveness of Instructional Strategies for Vocabulary Acquisition	15
Impact of Vocabulary on Comprehension	16
Effect of Prior Knowledge on Comprehension	18
The Relationship Between Prior Knowledge and Reading Ability	18
Effectiveness of Instructional Strategies for Passage Comprehension	19

Page

Discussion. 22

Summary 25

References 27

Appendix: Lesson Plan Outlines 33

List of Tables

Table		Page
1	Mean percent correct and standard deviations for vocabulary pretest and posttest by condition and passage	16
2	Mean percent correct and standard deviations for vocabulary pretests and posttests and gain scores by treatment and by passage	17
3	Mean percent correct on comprehension tests for full condition subjects by prior knowledge groups	19
4	Mean percent correct and standard deviations for comprehension tests by passage and treatment within condition	20
5	Mean percent correct on comprehension tests for full condition subjects blocked by prior knowledge ranks and by treatment	21

List of Figures

Figure		Page
1	The semantic map for *Prairie Schooners*	11
2	The semantic feature analysis grid for *Prairie Schooners*	12
3	A worksheet for *Prairie Schooners* for the basal full treatment condition	14

Abstract

The purpose of this study was to identify the contributions of both prior knowledge and pre-reading vocabulary instruction to passage comprehension. Semantic mapping and semantic feature analysis were compared with a modified basal approach for effectiveness as pre-reading instructional treatments for both vocabulary acquisition and passage comprehension. Semantic mapping and semantic feature analysis are instructional strategies which build upon the prior knowledge bases of students. The basal approach had been modified to also draw on students' prior knowledge.

Thirteen fourth-grade classrooms participated in the study. Results indicated that all three pre-reading treatments were effective in teaching the target vocabulary words. Significant gains were observed between the vocabulary pre- and posttest for the students receiving full instruction and for the students in the partial control condition that received vocabulary instruction but did not read the passage.

The study also confirmed the strong relationship between prior knowledge and reading comprehension. Students with a high level of prior knowledge performed well on the passage comprehension test regardless of treatment. While there were no significant treatment differences between subjects on the passage comprehension test, when subjects were grouped by prior knowledge level there was a tendency for the comprehension scores for students in both the semantic mapping and semantic feature analysis groups to be higher than the scores for students who received the more traditional basal pre-reading instruction.

I. Introduction

Vocabulary knowledge has always been identified as a significant component in reading comprehension. The emphasis on acquiring new word knowledge as part of reading instruction is based to a large extent on the fact that "comprehension is building bridges between the new and the known" (Pearson & Johnson, 1978, p. 24); i.e., for new concepts to be learned, they must be related to concepts already known. Research theorists concerned with the pedagogical impact of schema theory on reading comprehension have provided evidence that a reader's prior knowledge is an important factor in reading comprehension (Adams & Bruce, 1980; Anderson, Spiro, & Anderson, 1978; Beck & McKeown, 1983; Johnston, 1983; Johnston & Pearson, 1982; Lipson, 1982; Rumelhart, 1980).

The importance of prior knowledge and the way it is stored and retrieved (Collins & Quillian, 1969; Lindsay & Norman, 1972; Massaro, 1975) has prompted a new focus in vocabulary research. While there have been studies to explore the effectiveness of selected vocabulary instructional teaching strategies (Jenkins, Pany, & Schreck, 1978; Pany & Jenkins, 1978; Taylor, Thurlow, & Turnure, 1974), only recently have researchers begun to consider the level of prior knowledge as a concomitant variable or employed teaching strategies that tap prior knowledge.

The purpose of the study reported here was to investigate the effects of both prior knowledge and vocabulary instruction on passage comprehension. The treatments used were based on three instructional vocabulary strategies. Two of the strategies, semantic mapping and semantic feature analysis, build upon the prior knowledge bases of children. Both of these strategies are predicated on the fundamental vocabulary development process of formulating categorical relationships between and among concepts (vocabulary) in order to organize new and known information for later retrieval (Johnson, Toms-Bronowski, & Pittelman, 1982; Johnson, Pittelman, et al., 1982). The third strategy, the basal approach, was adapted from what is typically recommended in basal reading series to draw upon the children's prior knowledge bases.

VOCABULARY AND READING COMPREHENSION

Early researchers in reading comprehension and in verbal intelligence documented the significant role that vocabulary knowledge plays in both of these areas (Albright, 1927; Hilliard, 1924; Pressey & Pressey, 1921). More recent research using factor analysis (Davis, 1944, 1968, 1972; Johnson, Toms-Bronowski, & Buss, 1983; Spearritt, 1972; Thurstone, 1946), readability (Chall, 1958; Klare, 1974-75), and test construction (Farr, 1969) has consistently found strong correlations between vocabulary knowledge and reading comprehension. While there is a lack of agreement about the source

of these correlations, reading educators have long accepted the notion that reading comprehension is based on a number of subskills (Barrett, 1968; Davis, 1944, 1968, 1972; Otto & Askov, 1974; Rosenshine, 1980). Among the identified subskills, knowledge of word meanings has been selected as one of the most critical components of successful reading (Barrett & Graves, 1981; Becker, 1977; Davis, 1972; Hunt, 1957; Johnson, Toms-Bronowski, & Buss, 1983; Spearritt, 1972).

There has been an increasing interest by researchers in examining the effects of vocabulary instruction on passage comprehension. Beck, Perfetti, and McKeown (1982) studied the effects of vocabulary knowledge on lexical access and reading comprehension. As part of their study, they examined the relationship between long-term vocabulary instruction and passage comprehension in 27 fourth-grade children. Beck et al. reported that subjects who received vocabulary instruction learned the 104 target vocabulary words and processed these words on the comprehension task more efficiently than did the control subjects.

Stahl (1982) examined the effects of direct vocabulary instruction on reading comprehension on 28 average fifth-grade students. Two vocabulary training treatment groups, a definitional treatment and a mixed definitional and context treatment, were compared to a control group. All subjects received all three treatments in a counterbalanced order. Both vocabulary treatments produced significantly higher scores on the passage comprehension tests for two of the three treatment orders, and significantly higher scores on the vocabulary tests for all three treatment orders. The mixed method of vocabulary instruction (definitional and context) produced significantly higher passage comprehension scores than did the definitional method. Stahl concluded that pre-reading instruction had a significant effect on both comprehension and vocabulary learning.

Kameenui, Carnine, and Freschi (1982) conducted studies with 60 fourth-, fifth-, and sixth-grade students to see whether learning the meanings of difficult words facilitated passage comprehension. Subjects were individually trained and tested. Passage comprehension was assessed with a multiple-choice test using an experimenter-developed 66-word passage containing six difficult vocabulary words. Subjects who received vocabulary instruction on the difficult words performed significantly better on the comprehension measure than subjects who did not receive instruction. These results suggest that learning the meanings of difficult vocabulary words enhances comprehension.

PRIOR KNOWLEDGE AND READING COMPREHENSION

Reading educators have long recognized the need for readers to draw upon their own experiences to comprehend what they read and have recommended numerous instructional techniques for facilitating comprehension. Until recently, however, the theoretical basis and

empirical data needed to support the recommendations for these instructional practices have been lacking. Current interest in understanding the relationship between prior knowledge and reading comprehension has resulted in an "explosion of research" that has "greatly enhanced understanding of how one's background knowledge about text concepts functions in the reading process" (Beck & McKeown, 1982 p. 15.)

Understanding how prior knowledge affects the comprehension of text is dependent upon an understanding of the notion of schemata, or knowledge structures, that serve as frameworks for related concepts (Anderson, Spiro, & Anderson, 1978). Rumelhart (1980) described schemata as building blocks of cognition. He explained that schemata are the fundamental elements upon which all information processing depends. Schemata are employed in interpreting sensory data (both linguistic and nonlinguistic), in retrieving information from memory, in organizing actions, and generally in guiding the flow of comprehension processing. A schema-theoretic view of reading comprehension describes it as constructing a model of the meaning of text by integrating existing knowledge structures with the cues provided in the text. Reading comprehension, therefore, can be operationally defined as the "process of using prior knowledge and the cues provided by the writer to construct a model of the meaning of the text which hopefully bears some resemblance to the author's intended meaning" (Johnston & Pearson, 1982, p. 2).

The act of comprehending requires the reader to make inferences about information not explicitly stated in text. These inferences are necessary to connect parts of text and to bring prior knowledge to bear on the text (Lipson, 1982). Adams and Bruce (1980) stated that "without prior knowledge, a complex object, such as a text, is not just difficult to interpret; strictly speaking, it is meaningless" (pp. 36-37). It follows, then, that the reader who brings a strong prior knowledge base to the reading task can generate the inferences required to construct a model of the meaning with more ease than the reader with a weak prior knowledge base. It should be noted, however, that in either case a poorly written text makes inferencing more difficult (Johnston & Pearson, 1982).

Within the schema-theoretic view of the comprehension process, various reasons have been proposed for explaining comprehension failures. Johnston (1983) suggested that poor comprehension may be the result of some type of mismatch between the reader's background knowledge and the text. These mismatches may be either quantitative, in which there is a lack of relevant background knowledge, or qualitative, in which the reader builds an inappropriate model of text meaning. Similarly, Rumelhart (1980) suggested three possible reasons for failure to understand a passage: 1) the reader may not have the appropriate schemata; 2) the reader may have the appropriate schemata, but the author offers insufficient clues to suggest them; or 3) the reader may build a consistent interpretation of the text, but not the one intended by the author.

A number of studies have been conducted which focus on the effects of prior knowledge on reading comprehension. Pearson, Gordon, and Hansen (1979), for example, tested the comprehension of a passage about spiders by 20 above-average second-grade students who had high and low background knowledge. While there was no significant difference in performance between the high and low prior knowledge groups on the textually explicit comprehension questions, the high prior knowledge group significantly outperformed the low knowledge group on the scriptually implicit questions. Langer and Nicolich (1980), in a study with high school seniors, found that the level of prior knowledge, as measured by a free association task, was strongly related to the free recall of a passage. Regarding the powerful influence of prior knowledge on reading comprehension, Lipson (1982) found that third-grade students were better at acquiring new information when reading than they were at correcting inaccurate prior "knowledge." Before reading, subjects were given pairs of statements and asked to either indicate which of the two statements was correct or pass on any items about which they were unsure. After reading, subjects were given the same recognition items as a posttest. Students who had indicated they did not know which one of the paired statements was accurate on the pretest were more likely to get the posttest item correct than those subjects who had responded incorrectly on the pretest.

A recent study by Lipson (1983) showed that having a relevant schema regarding a text that was to be read was an advantage for fourth-, fifth-, and sixth-grade subjects. Subjects attending Catholic and Jewish private schools read two passages, each specific to one of the two religious affiliations. On a free recall measure, subjects recalled significantly more text-based propositions from the familiar passage than from the unfamiliar passage. Also, subjects were significantly more successful in responding to questions for the passage related to their own religion.

Holmes (1983) conducted a study with 56 fifth-grade students to compare the question answering of good and poor readers who had varying levels of prior knowledge on specific passage topics. During treatment subjects read one of two experimenter-developed ten-paragraph passages that approximated the subjects' instructional reading level. Poor readers did not use prior knowledge to the same extent as good readers when learning new information. Poor readers have difficulty answering textually implicit questions even if they possess adequate prior knowledge of passage topics; for good readers, possessing a large store of prior knowledge seemed to greatly facilitate question answering. However, there were few differences in the question answering of good and poor readers with less prior knowledge.

THE EFFECTS OF PRIOR KNOWLEDGE ACTIVATION ON PASSAGE COMPREHENSION

Recent research has focused on investigating the effects of activating prior knowledge and providing students with additional

background knowledge in preparation for reading. Langer (1981) developed a Pre-Reading Plan (PReP) to help students activate prior knowledge before reading, as well as to help the teacher become aware of the level of knowledge students have about a topic before reading. The procedure involves three phases. First, free associations to a word or phrase from the reading material are elicited from students, and these responses are written on the chalkboard. Second, students are asked to reflect on the initial associations, telling why they thought of the associations they had made. Finally, students are asked to talk about any new ideas that have resulted from the activity. According to a set of criteria to evaluate students' responses, the teacher can determine whether the student has "much," "some," or "little" prior knowledge about the topic of interest. Langer and Nicholich (1980) used the PReP method with sixth-grade high, average, and low achieving readers and found that students' prior knowledge ratings were good predictors of reading comprehension. When subjects were separated into above, on-level (average), and below prior knowledge groups the average students who participated in the PReP activity scored significantly higher on a measure of passage comprehension and on the re-administration of the free-association task than did the average subjects who participated in the other treatments. The researchers speculated that the highly skilled readers could already do what the activity helped the average readers to do, and that the less skilled readers needed direct instruction in the concepts prior to reading.

Beck, Omanson, and McKeown (1982) redesigned the pre-reading component of lessons from basal readers and compared performance of third graders on the original and revised versions. In addition to introducing background information, the revised lessons highlighted important story content through pre-Silent Reading Unit (SRU) discussions and post-SRU questions. Furthermore the pictures accompanying the story were redrawn to depict central content in a manner consistent with the overall plot of the story. Students who received the revised lessons answered more comprehension questions correctly and recalled more of the story content than students in the control group. While the design of the lessons encompassed other factors in addition to increasing students' knowledge level before reading, results support providing background knowledge to enhance story comprehension (Beck & McKeown, 1982).

Stevens (1982) also found that teaching background information about a topic can improve students' comprehension of text. Before reading a passage, high school sophomores heard a lecture that was either related to the topic or was unrelated to it. Students who received relevant background knowledge performed significantly better on the comprehension measure than students in the control group, who heard the lecture on an unrelated topic.

A study by Crafton (1983) lends further support to the idea that providing background knowledge improves comprehension. In this study, half of the 30 eleventh-grade subjects read two expository passages dealing with the same topic. The other half of the subjects read two unrelated passages. The second passage was the same for

both groups. Students who read the two related passages performed significantly better on a comprehension measure for the second passage than did students who read the unrelated selection first. Crafton concluded that students can improve their background knowledge through reading additional material related to the same topic.

PURPOSE OF THE PRESENT STUDY

While there have been numerous studies to evaluate the effects of instruction in vocabulary and the effects of activating prior knowledge on reading comprehension, in few studies have the two factors been investigated concurrently. Of prime interest in the study reported here is the effect on comprehension of three pre-reading treatments: semantic mapping, semantic feature analysis, and a modified basal approach. All three of these treatments activate students' prior knowledge as well as provide vocabulary instruction on passage-related target words. This study was designed to examine the roles of prior knowledge, reading ability, and vocabulary knowledge in relationship to passage comprehension. Of additional interest was the question of whether there were differential effects of the three pre-reading treatments on vocabulary acquisition and passage comprehension.

The research questions addressed in the present study are as follows:

1. Is each of the three pre-reading vocabulary treatments (semantic mapping, semantic feature analysis, basal) an effective strategy for vocabulary acquisition?

2. Does knowledge of specific vocabulary words affect a student's comprehension of a passage containing those words?

3. Does the level of prior knowledge have a significant effect on the comprehension of a passage related to that topic?

4. Are the three pre-reading vocabulary treatments (semantic mapping, semantic feature analysis, and basal) equally effective strategies for promoting passage comprehension?

A primary concern of this study was to maintain the ecological validity of the research environment. In order to accomplish this, instructional materials and assessment procedures were used that were similar to those currently in use in elementary school classrooms.

II. Method

SUBJECTS

Students from 13 fourth-grade classes, representing three midwestern school districts, participated in the study. Subjects from the first school district were all the fourth-grade students (6 classes) in the district. This district serves both an industrial and a rural population. Subjects from the second school district were from three of the fourth-grade classes in the district. This district, a metropolitan suburb, also includes a substantial rural population. The students in both of these school districts reflect a range of socio-economic backgrounds. Children from four fourth-grade classes in the third school district served as the control group for the study. This third school district is comprised primarily of a rural, middle-class population.

DESIGN

The design of the study required three treatment conditions, full, partial, and control. Subjects in the full condition both received pre-reading vocabulary instruction and read a basal passage, prior to taking vocabulary and passage comprehension tests for each topic. Subjects in the partial condition either received the vocabulary lesson or read the passage prior to taking the vocabulary and passage comprehension tests. (It was anticipated that the inclusion of a partial condition would provide additional data on the relative effectiveness of the three vocabulary strategies for direct vocabulary instruction.) Subjects in the control condition (no treatment) neither received pre-reading vocabulary instruction nor read the passages. They only participated in the assessment measures. They, therefore, provided baseline data for dependent measure performance.

PROCEDURE

Eight weeks prior to the beginning of treatment, a 32-item multiple-choice prior knowledge test and a ten-item multiple-choice vocabulary test were administered to the subjects from all three school districts. The prior knowledge test for each topic consisted of 16 questions--seven questions for which the answer appeared in the related passage and nine questions for which the answer did not appear in the passage. None of the target words were used in the questions of the responses.

Each of the six classrooms from the first school district (the full instruction condition) was randomly assigned to one of the three instructional treatments. Each of the three classes from the second

school district (the partial instruction condition) was also randomly assigned to one of the three instructional treatments.

One-hour inservice workshops were conducted by project staff to familiarize the teachers with the instructional treatment to which their class had been randomly assigned. No workshop was held for the teachers in the control school district.

Treatment for the nine classes receiving instruction was spread over a period of three lessons (Practice Lesson A and Lessons 1 and 2) with one lesson taught each week. All nine classrooms did the same practice lesson. All three passages were expository. One treatment passage, Prairie Schooners, focused on a social studies topic (wagon trains) while the other treatment passage, The Moon, focused on a science topic. Copies of the passages had been reproduced directly from the student text, with illustrations intact.

For the practice lesson and the two treatment lessons in the full instruction condition, the classroom teacher first taught five passage-specific vocabulary words using the assigned instructional strategy. Then, students were directed to read independently a four- to six-page passage taken from a fifth-grade basal series. The passages used for Lessons 1 and 2 were presented in a counterbalanced order across treatments for the six classes receiving the full treatment. Students in the three classes assigned to the partial instruction condition only received vocabulary instruction for the practice lesson and for the passage Prairie Schooners and only read the passage The Moon.

At the end of Lesson 1 and Lesson 2, students in both instructional conditions were given a multiple-choice comprehension test related to the topic of the passage and a written production definition test for the five target vocabulary words for that lesson. Students in the control group were also given the comprehension test but took a multiple-choice vocabulary test instead of a production vocabulary test.

Three weeks after the completion of treatment, the multiple-choice prior knowledge test and the multiple-choice vocabulary test, both of which had been given eight weeks prior to treatment, were readministered to the full and partial treatment classes.

DEVELOPMENT OF MATERIALS

SELECTION AND VALIDATION OF PASSAGES AND OF TARGET WORDS

Ten passages (eight expository passages and two narrative passages) were initially selected from two widely used fifth-grade basal reading series. A primary criterion used in selecting the passages was whether semantic maps and semantic feature analysis grids could be developed on the topic of the passage. Eight to ten potential target words were then identified for each passage. One

criterion used in selecting the target words was whether a word was important to the overall comprehension of the passage. A second criterion was the unfamiliarity of the word to fourth-grade students, according to information in The Living Word Vocabulary (Dale & O'Rourke, 1976).

To assure that the target word would be unknown to the subjects in the study, the potential target words were pilot tested with 117 fourth-, fifth-, and sixth-grade students from a school district that had a population comparable to the subjects in the study. For each passage, six to eight target words, those known by 35% or fewer of the students at each grade level, were identified. The number of potential passages was also reduced from ten to six.

A month later, a multiple-choice vocabulary test assessing the 48 potential target words was again administered at each of the three grade levels to test for reliability. Based on the reliability score for each word and the mean score for each passage, the three passages and five words for each passage were selected for use in the study.

DEVELOPMENT OF THE PRIOR KNOWLEDGE TEST

Development of the instrument to assess prior knowledge began with the administration of a "Topic Inventory" to a class of students enrolled in a graduate reading course at the University of Wisconsin-Madison. Students were given the three topics and were asked to list as much information or as many facts as they could about each topic. The 10 facts most frequently generated for each of the three passage topics were identified. Information on which to base the prior knowledge questions was also obtained from children's books and encyclopedia entries (Encyclopedia Americana, 1980; The New Encyclopedia Britannica, 1980; The World Book Encyclopedia, 1984). A survey of the literature on the assessment of prior knowledge was also conducted prior to the development of the test. Based on this literature review, a multiple-choice recognition task was chosen to assess prior knowledge of the passage topic. Of five procedures identified by Holmes and Roser (1980) as effective methods for assessing prior knowledge, the recognition task appears to be most adaptable to large-group administration. The prior knowledge test for each topic consisted of 16 questions--seven for which the answer is given in the passage and nine questions for which information needed to answer the question is not in the passage. None of the target words were to be used in the questions or the responses.

DEVELOPMENT OF THE COMPREHENSION TEST

To assess comprehension of each passage, a multiple-choice test was administered to the subjects at the end of each of the two lessons. (A test to assess passage comprehension was not administered at the end of the practice lesson.) Each passage comprehension test was composed of 23 items: the seven questions from the prior knowledge test which are answered in the passage and

16 new items. Care was taken in developing the 16 new items to ensure that the test items were balanced in terms of (1) whether the items were central (main idea) or peripheral (detail) to the passage, as defined by Johnston (1982), and (2) whether the items were textually explicit or textually implicit (Pearson & Johnson, 1978). Furthermore, the five target vocabulary words were each included once in a stem and once in a response within the 16 items for each passage.

DEVELOPMENT OF MATERIALS FOR FULL INSTRUCTION CONDITION

An overview of the development of the lessons for each of the three instructional treatments is presented below.

Semantic Mapping

Prototypic maps that had been generated as part of the procedure for passage selection were refined. A map containing the five target words as well as a few familiar words was finalized for each passage. Detailed lesson plans were then written for the teachers to use when introducing the target words through semantic mapping. In the lessons the teacher was directed to use the map to focus on the story topic as well as on the target words. A copy of the semantic map for the passage Prairie Schooners is presented in Figure 1. An outline of the lesson plan for the semantic mapping full treatment condition is in the Appendix.

Semantic Feature Analysis

Prototypic grids that had been generated as part of the procedure for passage selection were refined. A semantic feature analysis grid reflecting the topic of the passage was finalized for each of the three passages. Each grid included the five target words as well as a few familiar words. A copy of the semantic feature analysis grid for the passage Prairie Schooners is presented in Figure 2. An outline of the lesson plan for the semantic feature analysis full treatment condition is in the Appendix.

Basal

Five basal series were examined to determine the types of activities typically recommended for teaching vocabulary words before students read a new passage. Nearly all of the series included an activity involving definition writing (either using a dictionary or as a result of class discussion) and an activity for using the vocabulary words in context (written exercises or class discussion using the words in student-generated or completion sentences). Furthermore, the definitions were usually limited to those appropriate for the passage, but rarely was a word related specifically to the content of the passage. The lesson format

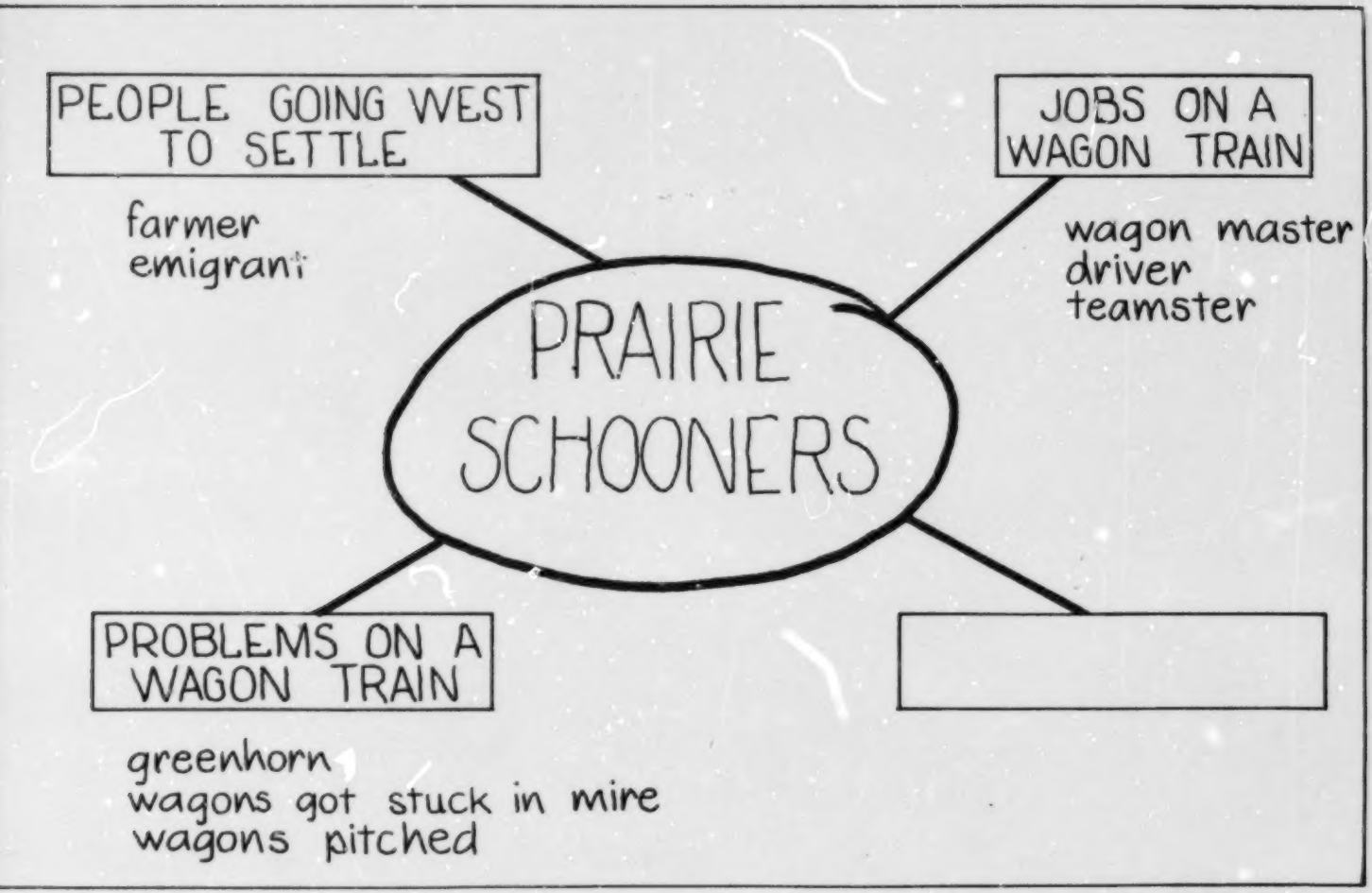

Figure 1. The semantic map for Prairie Schooners.

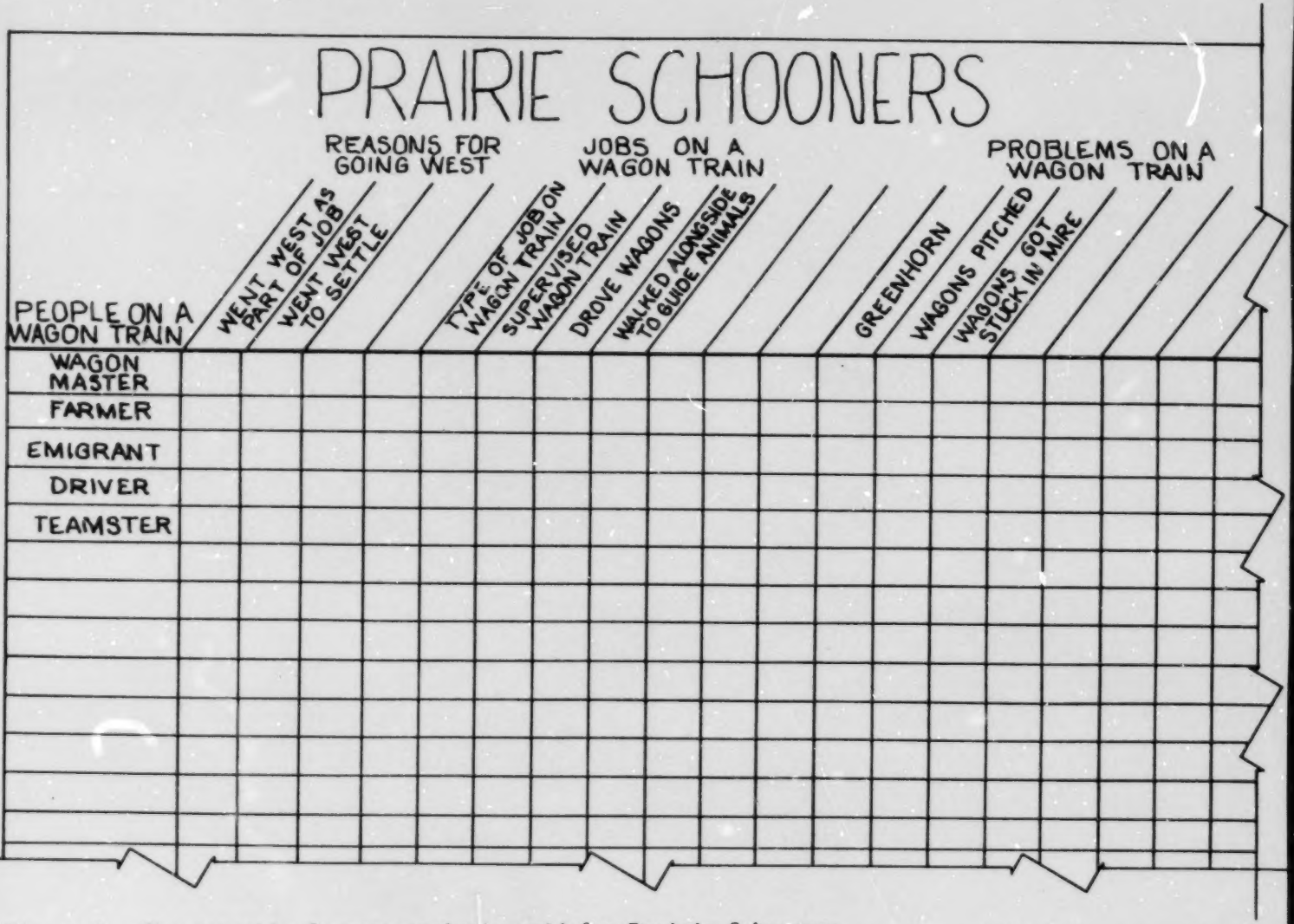

Figure 2. The semantic feature analysis grid for Prairie Schooners.

developed for the "basal" approach in the study was modified from the procedures commonly found in basal series. Students were first introduced to a target word within a familiar context. Only after the students had related the target word to their own experiences was the discussion limited to the meaning of the word as it was used in the passage. Furthermore, the word was directly related to the content of the passage. A copy of the cloze paragraph for Prairie Schooners which students completed using the target words is presented in Figure 3. An outline of the lesson plan for the modified basal full treatment condition is presented in the Appendix.

DEVELOPMENT OF MATERIALS FOR THE PARTIAL TREATMENT CONDITION

Separate lesson plans were developed for the partial condition for each of the three treatments. The lessons either focused on vocabulary instruction (for the Practice Lesson and Lesson 1) or on preparing the students to read the passage (Lesson 2). The lessons for vocabulary instruction for the semantic mapping and semantic feature analysis treatments directed the teacher to use the map (or grid) to teach the vocabulary words in the context of the topic being developed. In the basal treatment, the teacher was told to have a class discussion to relate the vocabulary words to the topic wagon trains. The lesson plans for Lesson 2 directed the teacher to simply introduce the title of the story that the class would be reading and have the students read the story.

Conventional Basal

Wagon Trains

Name _____

Teacher's Name _____

Read the entire paragraph all the way through. Then go back and fill in each blank with the best word. Use each word shown below only once.

---

emigrants teamster mire pitched greenhorns

When _____ traveled West on wagon trains they often ran into many problems. One reason they had trouble was because so many of them were _____ and did not know how to steer wagons or to handle the livestock. In fact, most of the pioneers had never traveled in wagons before. Many times a wagon _____ over the rough land right into some _____. Then it would take a skilled _____ to guide the animals that were hitched to the front of the wagon out of that mess.

Figure 3. A worksheet for Prairie Schooners for the basal full treatment condition.

III. Results

Prior to the report of results, several sample characteristics should be noted. Each of the three conditions (full, partial, and control) was in a separate school district. The preliminary descriptive analyses indicated that the three samples were not as comparable as had been anticipated. The districts differed significantly in performance on both of the pre-treatment measures (vocabulary pretest and prior knowledge inventories), with students in the control district lower than the other two districts. For this reason, the control (no-treatment) scores were included in the preliminary analyses but not included in the analyses of variance. Furthermore, the mean scores for the prior knowledge inventory were higher for subjects in the partial condition than for subjects in the full condition. For these reasons, all analyses were within district and are therefore separate for full and partial conditions.

EFFECTIVENESS OF INSTRUCTIONAL STRATEGIES FOR VOCABULARY ACQUISITION

The first research question addressed in the study was whether each of the three pre-reading vocabulary treatments (semantic mapping, semantic feature analysis, basal) is an effective strategy for vocabulary acquisition. Analysis of the data from the vocabulary pre- and posttests indicated that the pre-reading vocabulary treatments were effective when compared to the control (no-treatment) condition. Table 1 presents the means and standard deviations for the pre- and posttests. Gains in partial and full treatment conditions exceeded gains for the control group ($t = 2.88$, $p < .001$ for The Moon; $t = 17.84$, $p < .001$ for Prairie Schooners). Gains in each treatment group were significant (for The Moon, in the full treatment condition, $t(127) = 18.74$; for Prairie Schooners, in the full treatment condition, $t(127) = 22.49$, in the partial treatment condition, $t(70) = 18.35$; $p < .001$).

During the two treatment weeks, a production vocabulary test was administered to subjects in the full and partial treatment conditions immediately following each of the two vocabulary lessons. In the production test, subjects had to write a sentence which indicated that they knew the definition of the word. Subjects in all three treatments performed at a higher level on the production test than they had on the vocabulary pretests. No further comparisons were made between the vocabulary pretests and the production vocabulary tests because the two tests were of a different format.

While it was clear from the data analysis that all vocabulary instruction did facilitate the learning of the target vocabulary, an issue addressed in this study was whether the three instructional methods were equally as effective for teaching the words.

Table 1

Mean Percent Correct and Standard Deviations for Vocabulary Pretest and Posttest by Condition and Passage

Conditions	Pretest $\bar{X}$	Pretest S.D.	Posttest $\bar{X}$	Posttest S.D.	Gain Scores
		The Moon[a]			
Full (n=128)	36.87	25.71	85.16	21.05	48.29
Control (n=122)	28.85	20.58	46.39	21.93	17.54
		Prairie Schooners			
Full (n=128)	34.33	24.23	90.70	18.91	56.37
Partial (n=71)	30.96	22.12	89.58	18.47	58.62
Control (n=124)	27.26	22.43	27.11	18.41	-.15

[a]Subjects in the Partial Condition did not receive vocabulary instruction for The Moon.

Basically, subjects' scores on the vocabulary tests did not differ by type of instructional treatment. As indicated in Table 2, the mean gain was comparable across treatments. There were, however, significant treatment differences for subjects in the partial condition on the vocabulary posttest for the words from Prairie Schooners ($F(2,68) = 8.33$, $p < .001$). These subjects received vocabulary instruction but did not read the passage. Subjects who were taught the target vocabulary words through the semantic mapping strategy scored significantly higher than subjects who were taught through semantic feature analysis ($t(68) = 4.19$, $p < .001$). Subjects in the basal group also scored significantly higher than did the semantic feature analysis subjects ($t(68) = 2.46$, $p < .05$). Since the subjects in the partial-treatment condition did not receive vocabulary instruction for The Moon, it was not appropriate to do a comparable analysis.

IMPACT OF VOCABULARY ON COMPREHENSION

A second question addressed in the study was whether knowledge of specific vocabulary words affected a student's comprehension of a passage containing those words. Analyses were conducted to determine the correlation between the performance of subjects in the full condition (received vocabulary instruction and read the passage) on

Table 2

Mean Percent Correct and Standard Deviations for Vocabulary Pretests and Posttests and Gain Scores by Treatment and by Passage

Treatment Conditions	Pretest $\bar{X}$	Pretest S.D.	Posttest $\bar{X}$	Posttest S.D.	Gain Scores
		The Moon[a]			
Full					
Semantic Mapping	39.11	22.94	86.56	18.64	47.45
Semantic Feature Analysis	34.21	27.47	80.57	24.49	46.36
Basal	36.86	26.94	87.08	20.42	50.22
Control	28.85	20.58	46.39	21.93	17.54
		Prairie Schooners			
Full					
Semantic Mapping	37.83	21.18	91.78	15.56	53.95
Semantic Feature Analysis	31.05	25.34	88.57	18.96	57.52
Basal	33.60	26.01	91.25	21.79	57.65
Partial					
Semantic Mapping	26.15	17.68	98.46	7.85	72.31
Semantic Feature Analysis	28.70	22.42	78.18	21.30	49.48
Basal	38.33	24.96	90.43	18.94	52.10
Control	27.26	22.43	27.11	18.41	-.15

[a]This analysis was not done for subjects in the partial condition for The Moon since they did not receive vocabulary instruction.

the weekly production vocabulary tests and on the corresponding weekly passage comprehension tests. The correlations for The Moon and Prairie Schooners passages were significant, with the correlations being $r = .53$, $t(121) = 6.87$, $p < 0.001$ and $r = .448$, $t(113) = 5.33$, $p < 0.001$ for The Moon and Prairie Schooners respectively. Within each treatment condition, the correlations were significant for The Moon. (The correlations for semantic mapping, semantic feature analysis, and basal were $r = .529$, $t(42) = 3.94$, $p < 0.001$; $r = .671$, $t(33) = 5.04$, $p < 0.001$; and $r = .464$, $t(48) = 3.55$, $p < 0.001$ respectively.) For the Prairie Schooners passage only the scores for subjects who received vocabulary instruction through the two semantic-based treatments of semantic mapping and semantic feature analysis were significantly correlated with the corresponding passage comprehension test scores. (The correlations for semantic mapping and semantic feature analysis were

.591 ($t(41) = 4.58$, $p < 0.001$) and .472, $t(31) = 2.88$, $p < 0.01$) respectively.)

EFFECT OF PRIOR KNOWLEDGE ON COMPREHENSION

The study was also designed to investigate whether the level of prior knowledge a student has about a particular topic has a significant effect on the comprehension of a passage related to that topic. Analysis of the data indicated that a student's prior knowledge of a topic did significantly affect passage comprehension. There appeared to be a direct relationship between subjects' prior knowledge, as indicated in the prior knowledge inventory, and their scores on the related passage comprehension test.

For this analysis, subjects in the full treatment condition were stratified into three prior knowledge groups according to their scores on the prior knowledge inventories. Comprehension scores were based on 16 of the 23 items; the remaining seven items on the comprehension test had also appeared on the prior knowledge inventory and therefore were not used in this analysis. (A separate analysis had shown that the 23-item and 16-item versions of the comprehension tests were highly correlated, $r = .966$ for The Moon and $r = .952$ for Prairie Schooners.)

The mean scores on the comprehension test differed significantly for subjects in each prior knowledge group for both The Moon and Prairie Schooners (see Table 3). Subjects in the High prior knowledge group scored significantly higher than the subjects in the Medium prior knowledge group, and the subjects in the Medium prior knowledge group scored significantly higher than the subjects in the Low prior knowledge group.

THE RELATIONSHIP BETWEEN PRIOR KNOWLEDGE AND READING ABILITY

It was expected that students with higher reading ability would perform better on the passage comprehension tests than students with lower reading ability. Additional analyses were performed, however, to investigate the association of passage comprehension with prior knowledge and reading ability (as measured by vocabulary and comprehension percentiles from a standardized test).

An analysis of covariance was conducted with both prior knowledge inventory scores and standardized reading ability (vocabulary and comprehension) percentiles covaried on The Moon and Prairie Schooners passage comprehension scores. The significant covariates for The Moon comprehension test were the standardized vocabulary percentiles ($F(1,68) = 5.09$, $p < .05$) and standardized comprehension percentiles ($F(1,68) = 9.05$, $p < .01$) while for the Prairie Schooners comprehension test the significant covariates were the comprehension percentiles ($F(1,66) = 6.65$, $p < .05$) and prior knowledge inventory scores ($F(1,66) = 13.03$, $p < .001$). The

Table 3

Mean Percent Correct on Comprehension Tests for Full Condition Subjects by Prior Knowledge Groups

Prior Knowledge Groups	Comprehension Test[a]	
	The Moon*	Prairie Schooners**
Low	55.84	52.23
Medium	68.44	65.62
High	78.31	77.68

[a]Scores were based on 16 items.

*$f(2,102) = 13.43$, $p < .001$, High > Medium > Low, each group differs from others with $p < .05$.

**$f(2,96) = 9.97$, $p < .001$, High > Medium > Low, each group differs from others with $p < .05$.

covariates above had high positive association among themselves. Subjects' prior knowledge inventory scores were positively correlated with their standardized reading test scores. (For The Moon and Prairie Schooners, respectively, the correlations of prior knowledge inventory scores with standardized vocabulary percentiles were $r = .544$, $t = 6.869$, $p < .001$ and $.621$, $t = 8.348$, $p < .001$; with standardized comprehension percentiles were $r = .506$, $t = 6.206$, $p < .001$; and $.560$, $t = 7.125$, $p < .001$.) Despite the high association of the covariates, it should be noted that levels of prior knowledge and of reading ability contribute to the (linear) explanation of passage comprehension.

EFFECTIVENESS OF INSTRUCTIONAL STRATEGIES FOR PASSAGE COMPREHENSION

The final question addressed in the study investigated whether the three pre-reading vocabulary treatments (semantic mapping, semantic feature analysis, and basal) are equally effective strategies for promoting passage comprehension.

Instructional treatment differences on the comprehension tests were not consistent across passages or conditions (see Table 4). Results of the analyses of variance for subjects in the full treatment condition (who received both the pre-reading vocabulary

Table 4

Mean Percent Correct and Standard Deviations for Comprehension Tests by Passage and Treatment Within Condition

Treatments	Comprehension Test[a]			
	The Moon		Prairie Schooners	
	$\bar{X}$	S.D.	$\bar{X}$	S.D.
Full	69.31	18.00	63.21	18.36
Semantic Mapping	75.09*	15.31	67.95	17.20
Semantic Feature Analysis	67.19	19.42	59.11	21.94
Basal	65.64	18.27	61.65	15.89
Partial[b]	76.06	14.21		
Control	46.05	12.81	41.96	14.23

[a]Scores were based on the complete 23-item test.

[b]Subjects in the partial condition did not read the passage Prairie Schooners.

*$p < .05$.

instruction and read the passage) were suggestive for Prairie Schooners ($F(2,112) = 2.35$, $p < 0.10$). For The Moon, the treatment groups differed ($F(2,119) = 3.52$, $p < 0.05$): semantic mapping scores were significantly higher than basal ($t(119) = 2.52$, $p < 0.02$) and higher than semantic feature analysis ($t(119) = 1.92$, $p < 0.06$).

When subjects were blocked by prior knowledge, there were also significant differences by vocabulary treatment for The Moon passage ($F(2,102) = 3.94$, $p < 0.05$). Table 5 shows that the semantic mapping group scored higher than the basal group overall ($t(102) = 2.76$, $p < 0.01$) and for low and medium prior knowledge groups ($t(102) = 2.08$, $p < 0.05$); and ($t(102) = 3.85$, $p < 0.001$) respectively. Although the semantic feature analysis group had higher scores than the basal group in all three prior knowledge levels, the overall effect was not significant ($t(102) = 1.83$, $p < 0.10$) nor was the effect significant at any of the levels of prior knowledge. At medium prior knowledge the means are nearly the same for the semantic mapping and semantic feature analysis groups, but the semantic mapping group had about three times more students. When scores on the Prairie Schooners comprehension test were stratified by level of prior knowledge, no treatment differences or interactions were observed ($F(2,96) = 0.62$, $p > 0.50$; $F(4,96) = 1.40$, $p > 0.20$).

Table 5

Mean Percent Correct on Comprehension Tests for Full Condition Subjects Blocked by Prior Knowledge Ranks and by Treatment

Treatment	Comprehension Test[a] The Moon	Prairie Schooners
	Low Prior Knowledge	
Semantic Mapping	64.17*	49.38
Semantic Feature Analysis	53.21	61.67
Basal	50.14	45.64
	Medium Prior Knowledge	
Semantic Mapping	72.77**	69.15
Semantic Feature Analysis	72.75	60.56
Basal	59.80	67.14
	High Prior Knowledge	
Semantic Mapping	80.33	83.80
Semantic Feature Analysis	80.43	75.25
Basal	74.15	74.00

[a]Scores were based on 16 items.

*Semantic Mapping > Basal, $p < .01$.

**Semantic Mapping > Basal, $p < .01$.

IV. Discussion

All three of the pre-reading treatments--semantic mapping, semantic feature analysis, and modified basal--proved to be effective strategies for vocabulary instruction. Teachers can therefore feel confident in selecting any of these three pre-reading vocabulary methods to introduce vocabulary words that will be presented in a passage. One possible explanation for the lack of significant treatment differences on the vocabulary test scores is that, following the vocabulary instruction, subjects in all three treatment groups read a passage which contained the target words. This additional exposure to the target words with the content of the passage may have served to sufficiently reinforce the meaning of the words that any possible pre-reading vocabulary treatment differences were obscured.

Vocabulary treatment differences did appear, however, in the partial condition where subjects received vocabulary instruction, but did not read the passage. Subjects who were taught the words through the semantic-based treatment of semantic mapping scored significantly higher on the vocabulary test than did subjects in both the semantic feature analysis and the basal groups. It therefore appears that if a teacher's objective is general vocabulary acquisition, it would be most efficient to select the semantic mapping strategy. The effectiveness of semantic mapping as an instructional strategy is supported by other studies of vocabulary acquisition including Hagen (1980), Jones (1984), Margosein, Pascarella & Pflaum (1982), and Toms-Bronowski (1982/1983).

A major research question addressed in this study was the impact of direct vocabulary instruction on passage comprehension, which is an area other researchers have explored as well. According to Mezynski (1983), who reviewed eight studies to determine the effects of vocabulary instruction on reading comprehension, only a few studies have been able to report a positive effect. Although all eight of the studies which Mezynski reviewed found that vocabulary instruction did indeed increase students' word knowledge, the relation of vocabulary instruction to comprehension is still somewhat unclear.

The results of the present study, however, do help to substantiate the widely held belief that instruction in specific words contained within a passage will increase a student's comprehension of that passage. The correlations between the weekly production vocabulary scores and the related passage comprehension scores were significant for both passages. Furthermore, when analyses were conducted for each method of vocabulary instruction (semantic mapping, semantic feature analysis, and basal), all six correlations between the weekly vocabulary test and the related passage comprehension test were positive, with five of the six being

significantly so. The one exception was basal instruction for the Prairie Schooners passage.

Several of the methodological issues which Mezynski (1983) raised in her review should be considered in order to evaluate fully our own findings. One of these issues was how critical the words targeted for instruction are to the comprehension of the total passage. While an attempt was made in the present study to select target words critical to comprehension, only five target words were selected for each passage. The density of the target words to the rest of the words in the passage in the present study was therefore quite low. A significant correlation, however, was found between performance on the vocabulary and comprehension measures in spite of the low density of the target words.

Another point raised by Mezynski that could have also had an impact on the results of the present study was whether information presented in the actual passage (i.e., context clues) could be used to understand the target words. Effects of pre-reading vocabulary instruction could be obscured if the contextual information presented in the passage itself provided reinforcement of the meaning of the target words. Based on the vocabulary test score results for The Moon for the students in the partial condition who did not receive vocabulary instruction but read the passage, reading the passage did indeed seem to facilitate students' acquisition of vocabulary. These students showed a significant increase in their scores from the vocabulary pretest to the vocabulary posttest.

A third issue is whether information presented as part of the vocabulary instruction might provide more clues to the comprehension of the passage than just the definition of the word. In the present study all three methods of pre-reading vocabulary instruction included discussions relating the vocabulary words to the content of the passage. In these discussions, general information related to the passage was presented which may have facilitated students' comprehension.

The results of the present study substantiated the widely held belief that the more prior knowledge a student has on a particular topic the better he or she will comprehend a related passage. Those students who had more prior knowledge related to the topic of the passage more readily comprehended the passage, regardless of the type of pre-reading instruction they received. In fact, the greater the level of students' prior knowledge, the less the impact of the type of pre-reading instruction on comprehension scores.

The method of vocabulary instruction used (semantic mapping, semantic feature analysis or basal), however, may have had a differential effect on comprehension. Students who received semantic mapping and semantic feature analysis instruction scored slightly higher on the passage comprehension tests in all but one instance than did students who received the basal instruction, with the differences being significant for students who received semantic mapping instruction for The Moon (refer to Table 5). While all three

of the pre-reading treatments drew upon students' prior knowledge to some degree, semantic mapping and semantic feature analysis are generally regarded as knowledge-based strategies. The procedures of semantic mapping and semantic feature analysis emphasize relating new words and concepts to information that the students already know. During instruction, not only do these two procedures activate a student's prior knowledge base, but they expand the student's knowledge base regarding the specific topic.

As anticipated, reading ability level was highly correlated with students' performance on the passage comprehension tests. Students with higher reading ability levels scored higher on the comprehension tests than did students with lower reading ability levels. The results of this study strongly support the widely held conviction that students who have a high reading ability will perform well on measures of passage comprehension. In contrast, subjects in this study who were identified as less able readers had lower comprehension scores.

V. Summary

The results of the present study add empirical validation to the effectiveness of using both semantic mapping and semantic feature analysis for general vocabulary acquisition. In this study, the semantic-based vocabulary teaching strategies proved to be at least as effective, and in some cases more effective, than a modified basal technique for general vocabulary development.

The results of the present study also confirmed that semantic mapping and semantic feature analysis are viable pre-reading strategies for teaching passage-specific vocabulary. For subjects in the semantic mapping and semantic feature analysis treatment groups, there was a significant correlation between students' performance on the vocabulary test and their performance on the comprehension test.

The study reaffirmed the strong relationship between prior knowledge and reading comprehension. Students with a high level of prior knowledge performed well on the passage comprehension test regardless of treatment. There was a tendency for the comprehension scores for students in both the semantic mapping and semantic feature analysis groups to be higher than the scores for students who received the modified basal pre-reading instruction, but this trend was not entirely consistent.

Further research is still needed to investigate the impact of vocabulary instruction on passage comprehension. Unanswered questions remain about the density of target words to the passage, the amount and type of instruction, as well as the effects of contextual clues in the passage itself. These issues must be resolved if researchers are going to be able to add empirical validation to the intuitive notion that "if you don't know the words, you're not going to understand the passage" (Johnson, Toms-Bronowski, & Buss, 1983, p. 254).

References

Adams, M., & Bruce, B. (1980). Background knowledge and reading comprehension (Reading Education Report No. 13). Urbana, IL: Illinois University, Center for the Study of Reading. (ERIC Document Reproduction Service No. ED 181 431)

Albright, B. F. (1927). Typical reading disabilities of college entrants. Unpublished master's thesis, University of Southern California, Los Angeles.

Anders, P. L., Bos, C. S., & Filip, D. (1983). The effect of semantic feature analysis in the reading comprehension of learning disabled students. (Paper presented at the annual meeting of the National Reading Conference, St. Petersburg Beach, Florida.)

Anderson, R. C., Spiro, R. J., & Anderson, M. C. (1978). Schemata as scaffolding for the representation of information in connected discourse. American Educational Research Journal, 15, 433-439.

Barrett, M. T., & Graves, M. F. (1981). A vocabulary program for junior high school remedial readers. Journal of Reading, 25, 146-150.

Barrett, T. C. (1968). Taxonomy of cognitive and affective dimensions of reading comprehension. In T. Clymer (Ed.), What is "reading?": Some current concepts (pp. 32-49). Chicago: University of Chicago Press.

Beck, I. L., & McKeown, M. G. (1982). Trends in instructional research in reading: A retrospective. Washington, DC: National Institute of Education.

Beck, I. L. & McKeown, M. G. (1983). Learning words well--A program to enhance vocabulary and comprehension. The Reading Teacher, 36, 622-625.

Beck, I. L., Omanson, R. C., & McKeown, M. G. (1982). An instructional redesign of reading lessons: Effects on comprehension. Reading Research Quarterly, 17, 462-481.

Beck, I. L., Perfetti, C. A., & McKeown, M. G. (1982). Effects of long-term vocabulary instruction on lexical access and reading comprehension. Journal of Educational Psychology, 74, 506-521.

Becker, W. C. (1977). Teaching reading and language to the disabled--what we have learned from field research. Harvard Educational Review, 47, 518-543.

Chall, J. S. (1958). Readability: An appraisal of research and application (Bureau of Educational Research Monographs, 34). Columbus: Ohio State University.

Collins, A. M., & Quillian, M. R. (1969). Retrieval time from semantic memory. Journal of Verbal Learning and Verbal Behavior, 8, 240-247.

Crafton, L. K. (1983). Learning from reading: What happens when students generate their own background information? Journal of Reading, 26, 586-592.

Dale, E., & O'Rourke, J. (1976). The living word vocabulary. Elgin, IL: Dome.

Davis, F. B. (1944). Fundamental factors of comprehension in reading. Psychometrika, 9, 185-197.

Davis, F. B. (1968). Research in comprehension in reading. Reading Research Quarterly, 3, 499-545.

Davis, F. B. (1972). Psychometric research on comprehension in reading. Reading Research Quarterly, 7, 628-678.

The Encyclopedia Americana. (1980). Danbury, CT: Americana Corporation.

Farr, R. (1969). Reading--what can be measured? Newark, DE: International Reading Association.

Hagen, J. E. (1980). The effects of selected pre-reading vocabulary building activities on literal comprehension, vocabulary understanding, and attitudes of fourth and fifth grade students with reading problems. (Doctoral dissertation, University of Wisconsin, Madison, 1979). Dissertation Abstracts International, 40, 6216A. (University Microfilms No. 80-07,553).

Hilliard, G. H. (1924). Probable types of difficulties underlying low scores in comprehension tests (University of Iowa Studies in Education II, No. 6). Princeton, NJ: Psychological Review Co.

Holmes, B. C. (1983). The effect of prior knowledge on the question answering of good and poor readers. Journal of Reading Behavior, 15(4), 1-18.

Holmes, B. C., & Roser, N. L. (1980). A comparison of techniques used to assess readers prior knowledge. Paper presented at the annual meeting of the National Reading Conference, San Diego, CA. (ERIC Document Reproduction Service No. ED 198 512)

Hunt, L. C., Jr. (1957). Can we measure specific factors associated with reading comprehension? Journal of Educational Research, 51, 161-171.

Jenkins, J. R., Pany, D., & Schreck, J. (1978). Vocabulary and reading comprehension: Instructional effects (Technical Report No. 100). Urbana-Champaign, IL: Center for the Study of Reading.

Johnson, D. D., Pittelman, S. D., Toms-Bronowski, S., Chu-Chang, M., Tsui, G., Yin, M. C., Chien, C. Y., & Chin, P. (1982). Studies of vocabulary development techniques in the United States of America and the Republic of China (Program Report 83-4). Madison, WI: Wisconsin Center for Education Research, University of Wisconsin.

Johnson, D. D., Toms-Bronowski, S., & Buss, R. (1983). Fundamental factors in reading comprehension revisited. In L. Gentile & M. Kamil (Eds.), Reading research revisited (pp. 247-255). Columbus, OH: Charles Merrill.

Johnson, D. D., Toms-Bronowski, S., & Pittelman, S. D. (1982). An investigation of the effectiveness of semantic mapping and semantic feature analysis with intermediate grade level children (Program Report 83-3). Madison, WI: Wisconsin Center for Education Research, University of Wisconsin.

Johnston, P. (1982). Question type and the assessment of reading comprehension. Paper presented at the annual meeting of the American Educational Research Association, New York.

Johnston, P. (1983). Prior knowledge and reading comprehension test bias (Technical Report No. 289). Urbana-Champaign, IL: Center for the Study of Reading.

Johnston, P., & Pearson, P. D. (1982). Prior knowledge, connectivity, and the assessment of reading comprehension (Technical Report No. 245). Urbana-Champaign, IL: Center for the Study of Reading.

Jones, S. T. (1984). The effects of semantic mapping on vocabulary acquisition and reading comprehension of black inner city students. Unpublished doctoral dissertation, University of Wisconsin, Madison. (University Microfilms No. 84-17,954)

Kameenui, E. J., Carnine, D. W., & Freschi, R. (1982). Effects of text construction and instructional procedures for teaching word meanings on comprehension and recall. Reading Research Quarterly, 17, 367-388.

Klare, G. R. (1974-75). Assessing readability. Reading Research Quarterly, 10, 62-102.

Langer, J. A. (1981). From theory to practice: A prereading plan. Journal of Reading, 25, 152-156.

Langer, J. A., & Nicolich, M. (1980). Effect of altered prior knowledge on passage recall. Unpublished manuscript, University of California. (ERIC Document Reproduction Service No. ED 197 282)

Lindsay, P., & Norman, D. (1972). Human information processing. New York: Academic Press.

Lipson, M. Y. (1982). Learning new information from text: The role of prior knowledge and reading ability. Journal of Reading Behavior, 14(3), 243-261.

Lipson, M. Y. (1983). The influence of religious affiliation on children's memory for text information. Reading Research Quarterly, 18(4), 448-457.

Margosein, C. M., Pascarella, E. T., & Pflaum, S. W. (1982). The effects of instruction using semantic mapping on vocabulary and comprehension. Paper presented at the annual meeting of the American Educational Research Association, New York. (ED 217 390)

Massaro, D. W. (Ed.). (1975). Understanding language: An information processing analysis of speech perception, reading, and psycholinguistics. New York: Academic Press.

Mezynski, K. (1983). Issues concerning the acquisition of knowledge: Effects of vocabulary training on reading comprehension. Review of Educational Research, 53, 253-279.

The New Encyclopedia Britannica. (1980). Chicago: Encyclopedia Britannica, Inc.

Otto, W., & Askov, E. (1974). The Wisconsin design for reading skill development: Rationale and guidelines (3rd ed.). Minneapolis: National Computer Systems.

Pany, D., & Jenkins, J. R. (1978). Learning word meanings: A comparison of instructional procedures. Learning Disability Quarterly, 1, 21-32.

Pearson, P. D., Gordon, C., & Hansen, J. (1979). The effect of background knowledge on young children's comprehension of explicit and implicit information. Urbana-Champaign, IL: University of Illinois, Center for the Study of Reading. (ERIC Document Reproduction Service No. Ed 169 521)

Pearson, P. D., & Johnson, D. D. (1978). Teaching reading comprehension. New York: Holt, Rinehart and Winston.

Pressey, L. W., & Pressey, S. L. (1921). A critical study of the concept of silent reading. Journal of Educational Psychology, 12, 25-31.

Rosenshine, B. (1980). Skill hierarchies in reading comprehension. In R. J. Spiro, B. C. Bruce, & W. F. Brewer (Eds.), Theoretical issues in reading comprehension, (pp. 535-554). Hillsdale, NJ: Lawrence Erlbaum Associates.

Rumelhart, D. E. (1980). Schemata: The building blocks of cognition. In R. J. Spiro, B. C. Bruce, & W. F. Brewer (Eds.), Theoretical issues in reading comprehension (pp. 33-58). Hillsdale, NJ: Lawrence Erlbaum Associates.

Spearritt, D. (1972). Identification of subskills of reading comprehension by maximum likelihood factor analysis. Reading Research Quarterly, 8, 92-111.

Stahl, S. A. (1982). Differential word knowledge and reading comprehension. Unpublished doctoral dissertation, Harvard University, Cambridge, MA.

Stevens, K. C. (1982). Can we improve reading by teaching background information? Journal of Reading, 25, 326-329.

Taylor, A. M., Thurlow, M. L., & Turnure, J. C. (1974). Elaboration as an instructional technique in the vocabulary development of EMR children (Research Report No. 59). Minneapolis: Research, Development, and Demonstration Center in Education of Handicapped Children.

Toms-Bronowski, S. (1983). An investigation of the effectiveness of selected vocabulary teaching strategies with intermediate grade level children (Doctoral dissertation, University of Wisconsin-Madison, 1982). Dissertation Abstracts International, 44, 1405A. (University Microfilm No. 83-16,238)

Thurstone, L. L. (1946). Note on a reanalysis of Davis' reading tests. Psychometrika, 11, 185-188.

Toms-Bronowski, S. (1983). An investigation of the effectiveness of selected vocabulary teaching strategies with intermediate grade level children. (Doctoral dissertation, University of Wisconsin, Madison, 1982). Dissertation Abstracts International, 44, 1405A. (University Microfilms No. 83-16,238)

The World Book Encyclopedia. (1984). Chicago: World Book, Inc.

Appendix

Lesson Plan Outlines

PASSAGE COMPREHENSION STUDY Full Condition

OUTLINE OF LESSON PLANS
Semantic Mapping

OBJECTIVE: To teach students vocabulary words in preparation for reading a story, using the instructional strategy of Semantic Mapping. In the lesson, major concepts developed in the story will be discussed with an emphasis on teaching the definitions of the five target vocabulary words.

MATERIALS: The Semantic Map for the story copied onto the chalkboard. One copy of the Semantic Map and of the story for each student.

PROCEDURE:

1. Introduction to the Story title (topic). Tell the students the title of the story they will be reading and briefly discuss the topic.

2. Review of Semantic Mapping Procedure. Explain that before they read the story you will be introducing some of the important vocabulary words used in the study. Review with the students that semantic mapping is a way of taking words they don't know and putting them into categories with words they already know. Give each student a copy of the semantic map and using either an overhead projector or a map drawn on the chalkboard, review the categories that are on the map.

3. Definition of Target Words. Tell the students the definition of each target word, relating the target word to the other familiar words listed in the same category on the map. For each category, have the students suggest another word and add it to the map.

4. Independent Work (5 minutes). Have the students work independently adding words and categories to their copies of the map.

5. Class Discussion. Add students' suggestions for additional words and categories to the chalkboard map and discuss them. (Take only a few suggestions at this time.)

6. Review of Target Words. Discuss the meaning of each of the target vocabulary words in relation to other words that are in the same category as well as to words that are in other categories.

7. Reading the Story (approximately 20 minutes). Tell the students that they are going to read a story and explain that as they read the story they will see many of the words and read about many of the ideas that are on their maps. Mention to the students that after they read the story they will have a chance to add some new words to their maps. (Let the students read the story at their own pace.)

8. Independent Work (5 minutes). After the students have finished reading the story have them work independently adding more words and categories (based on information from the story) to their copies of the map.

9. Class Discussion. Have the students share the words they added to their own maps. Add their suggestions to the class map, discussing each word in relation to other words already on the map.

10. Final Review of Target Words. Discuss the definitions of the target words with the students. Relate each target word to other words in its respective category and to the material that was presented in the story.

11. Further Additions to the Map. If time permits, have the students share any additional words and categories that they had written on their maps and add these to the class map. Discuss each word as it is added to the map.

12. Collect Students' Work.

PASSAGE COMPREHENSION STUDY Full Condition

OUTLINE OF LESSON PLANS
Semantic Feature Analysis

OBJECTIVE: To teach students vocabulary words in preparation for reading a story, using the instructional strategy of Semantic Feature Analysis. In the lesson, major concepts developed in the story will be discussed with an emphasis on teaching the definitions of the five target vocabulary words.

MATERIALS: The semantic feature analysis grid copied onto the chalkboard.
One copy of the Semantic Feature Analysis Grid and of the story for each student.

PROCEDURE:

1. Introduction to the Story Title (topic). Tell the students the title of the story they will be reading and briefly discuss the topic.

2. Review of Semantic Feature Analysis Procedure. Tell the students that before they read the story you will be introducing some of the important vocabulary words used in the story. Review with the students that Semantic Feature Analysis is a way to learn the meaning of new words by seeing how they are alike and different and by deciding what features or characteristics the new words share. Remind the students how plus (+), minus (-) and question marks (?) are used on the semantic grid. (A plus is used if the feature usually is true or usually described the word; a minus is used if the feature is true or usually is not true or did not usually apply, and a question mark is used if the students were not sure or if there was no clear-cut answer.) Then give each student a copy of the grid.

3. Definition of Target Words. Using either an overhead projector or a copy of the grid drawn on the chalkboard, discuss the entries in the grid. For each target word tell the students the definition, and then discuss the word in terms of the features listed on the grid. Have the students help you to decide whether to put pluses or minuses in a few of the boxes on the grid.

4. Independent Work (5 minutes). Have the students work independently filling in the pluses (+) and minuses (-) and question marks (?) on their copies of the grid, and adding other words and features to the grid.

5. Class Discussion. Add students' entries to the class grid. Discuss the pluses and minuses and question marks as you fill them in. (Take only a few suggestions at this time.)

6. Review of Target Words. Discuss the pluses and minuses that were filled in for each target word in terms of the semantic features that have been marked.

7. Reading the Story (approximately 20 minutes). Tell the students that they are going to read a story and explain that as they read the story they will see many of the words and read about many of the ideas that are on their grids. Mention to the students that after they read the story they will have a chance to add some new words to their grids. (Let the students read the story at their own pace.)

8. Independent Work (5 minutes). After the students have finished reading the story have them work independently adding more words and features (based on information from the story) to their copies of the grid.

9. Class Discussion. Have the students share entries they made on their own grids. Add their suggestions to the class grid, discussing each entry, as the appropriate pluses and minuses are filled in.

10. Final Review of Target Words. Discuss the definitions of the target words with the students in terms of the features that have been marked.

11. Further Additions to the Grid. If time permits, have the students share any additional entries they made on their grids and add them to the classroom grid. Have the class help you to fill in all the remaining pluses and minuses. Discuss each entry as it is made.

12. Collect Students' Work.

PASSAGE COMPREHENSION STUDY Full Condition

OUTLINE OF LESSON PLANS
Basal

OBJECTIVE: To teach students vocabulary words in preparation for reading a story, using a conventional basal strategy. In the lesson, major concepts developed in the story will be discussed with an emphasis on teaching the definitions of the five target words.

MATERIALS: A copy of Worksheets #1 and #2.
A copy of the story for each student.
The list of five target words (without definitions) copied onto the chalkboard.

PROCEDURE:

1. Introduction to the Story Title (topic). Tell the students the title of the story they will be reading and briefly discuss the topic.

2. Review of the Basal Method. Explain that before they read the story, you will be discussing some of the important vocabulary words used in the story. Point to the list of the target words on the chalkboard and tell the students that they will be doing several activities in order to learn these words.

3. Pronunciation and Definition of Target Words. For each target word, read the sentence provided in the lesson plans which contains the target word. Then have the students discuss the definition of the word in the context of the sentence.

4. Independent Work (5-10 minutes). Have the students work independently writing their own sentence for each target word.

5. Class Discussion. Have the students share some of their sentences with the class. Discuss the sentences in terms of the appropriate use of the target word.

6. Review of Target Words. Review the meaning of each of the target vocabulary words in relation to the topic of the story.

7. Reading the Story (approximately 20 minutes). Tell the students that they are going to read a story and explain that as they read the story they will see many of the words they just talked about.

8. Independent Work (5 minutes). After the students have finished reading the story, have them work independently on a worksheet in which they complete a paragraph (on the story topic) by filling in the blanks with the appropriate target words.

9. Class Discussion. Have the students share their answers to the completion worksheet. Then read aloud the entire paragraph, filling in all the blanks.

10. Final Review of Target Words. Review the definition of each of the target words with the students.

11. Collect Students' Work.